

What is claim d is:

1. A process for forming a trench-gate power MOSFET, comprising the steps of:

- 5 forming a trench deep into a drift layer of a first conductivity type above a substrate of said first conductivity type;
- forming a first oxide on a surface of said trench;
- depositing a nitride on a surface of said first oxide;
- 10 forming a second oxide filled in said trench;
- etching said second oxide for leaving a thick oxide at a bottom of said trench;
- etching said nitride for remaining a part of said nitride at said bottom of said trench;
- 15 forming a gate oxide on a sidewall of said trench;
- forming a gate conductor filled in said trench;
- forming a well region of a second conductivity type opposite to said first conductivity type adjacent to said sidewall of said trench;
- 20 forming a source region of said first conductivity type on said well region;
- forming an insulator for covering on said gate conductor and a surface of said source region; and
- depositing a metal for electrically connecting said source
- 25 region with said well region.

2. A process according to claim 1, further comprising etching said first oxide after said step of etching said nitride.

5 3. A process according to claim 1, further comprising forming a third oxide on said nitride and thick oxide before said step of forming a gate conductor.

10 4. A process according to claim 1, further comprising etching said first oxide before said step of forming a gate oxide.

5. A process according to claim 1, wherein said step of etching said second oxide for leaving a thick oxide on a bottom of said trench comprises the steps of:

15 etching said second oxide for removing said second oxide from said sidewall of said trench;
coating a photoresist on said second oxide remained at said bottom of said trench;
etching said second oxide not covered by said
20 photoresist; and
removing said photoresist for remaining said thick oxide at said bottom of said trench.

25 6. A process for forming a trench lateral power MOSFET with a trench bottom drain contact, comprising the steps

of:

forming a trench on a substrate of a first conductivity type;

doping a bottom of said trench for forming a drain region
5 of a second conductivity type opposite to said first conductivity type;

forming a first oxide on a surface of said trench;

depositing a nitride on said first oxide;

filling a second oxide in said trench;

10 etching said second oxide for forming a thick oxide at a bottom of said trench;

etching said nitride for leaving a part of said nitride remained at said bottom of said trench;

forming a gate oxide;

15 forming a gate conductor;

etching said second oxide, nitride and first oxide for exposing a surface of said drain region;

forming a source region of said second conductivity type on a surface of said substrate outside said trench;

20 forming a drain contact region on said exposed surface of said drain region;

depositing an insulator for covering on said gate conductor;

25 forming a drain conductor electrically connected to said drain contact region; and

depositing a metal for forming electrodes.

7. A process according to claim 6, further comprising etching said drain region after said step of doping a bottom of said trench for forming a drain region for said trench more deeper into said substrate.

8. A process according to claim 6, further comprising etching said first oxide after said step of etching said nitride.

9. A process according to claim 8, further comprising oxidation after said step of etching said first oxide.

10. A process according to claim 6, further comprising etching said first oxide before said step of forming a gate oxide.

11. A process according to claim 6, further comprising forming a contact region of said first conductivity type adjacent to said source region.

12. A process according to claim 6, wherein said step of etching said second oxide for forming a thick oxide at a bottom of said trench comprises the steps of:

etching said second oxide for removing said second oxide from said sidewall of said trench;

coating a photoresist on said second oxide remained at
said bottom of said trench;

etching said second oxide not covered by said
photoresist; and

5 removing said photoresist for remaining said thick oxide
at said bottom of said trench.